

What is claimed is:

- 1 1. A radio frequency (RF) amplification system, comprising:
2 a power amplifier having:
3 an output node to carry an RF output signal; and
4 a power node coupled to said output node through a component having a
5 relatively high impedance at RF frequencies of said RF output signal;
6 a switch circuit to controllably couple said power node to a first power source
7 having a first potential; and
8 a regulator circuit to prevent a negative envelope of said RF output signal on
9 said output node from going substantially below a predetermined voltage level during
10 operation of said RF amplification system by controllably coupling said power node to
11 a second power source having a second potential in response to said negative envelope.

1 2. The RF amplification system of claim 1, wherein:
2 said second potential is greater than said first potential.

1 3. The RF amplification system of claim 1, wherein:
2 said predetermined voltage level is no less than a voltage level at which said
3 power amplifier leaves a linear region of operation.

1 4. The RF amplification system of claim 3, wherein:
2 said power amplifier includes at least one insulated gate field effect transistor;
3 and
4 said linear region of operation includes a saturation region of operation.

1 5. The RF amplification system of claim 1, wherein:
2 said switch circuit decouples said power node from said first power source when
3 a voltage on said power node increases a predetermined amount upon coupling said
4 power node to said second power source.

1 6. The RF amplification system of claim 1, wherein:
2 said switch circuit includes a control amplifier to compare a voltage on said
3 power node to a predetermined voltage level.

1 7. The RF amplification system of claim 6, wherein:
2 said switch circuit includes a switching device to controllably couple said power
3 node to the first power source in response to an output signal of said control amplifier.

1 8. The RF amplification system of claim 1, wherein:
2 said regulator circuit includes a negative envelope detector to detect said
3 negative envelope of said RF output signal on said output node of said power amplifier.

1 9. The RF amplification system of claim 8, wherein:
2 said regulator circuit includes a control amplifier to compare said negative
3 envelope to said predetermined voltage level.

1 10. The RF amplification system of claim 9, wherein:
2 said regulator circuit includes a device to allow current flow from the second
3 power source to the power node in response to an output signal of the control amplifier.

1 11. The RF amplification system of claim 1, comprising:
2 at least one first power source terminal to connect said RF amplification system
3 to the first power source.

1 12. The RF amplification system of claim 1, comprising:
2 at least one second power source terminal to connect said RF amplification
3 system to the second power source.

1 13. The RF amplification system of claim 1, further comprising:
2 a capacitor connected between said power node and a common node, said
3 capacitor having a relatively low impedance at RF frequencies of the RF output signal
4 and a relatively high impedance at envelope frequencies of the RF output signal.

1 14. The RF amplification system of claim 1, further comprising:
2 a second switch circuit to controllably couple said power node to a third power
3 source having a third potential, wherein said third potential is different from said first
4 said second potentials.

1 15. The RF amplification system of claim 1, wherein:
2 said component having a relatively high impedance at RF frequencies of said RF
3 output signal includes an inductor.

1 16. The RF amplification system of claim 1, wherein:
2 said component having a relatively high impedance at RF frequencies of said RF
3 output signal has a relatively low impedance at envelope frequencies of said RF output
4 signal.

1 17. A method comprising:
2 first coupling a power node of an RF amplifier to a first power source;
3 monitoring a radio frequency (RF) signal at an output node of the RF amplifier;
4 and
5 second coupling the power node of the RF amplifier to a second power source,
6 based on an envelope of said RF signal, to regulate a voltage level on the output node.

1 18. The method of claim 17, wherein:
2 second coupling includes coupling the power node of the RF amplifier to the
3 second power source when a negative envelop of the RF signal meets a predetermined
4 criterion.

1 19. The method of claim 18, wherein:
2 second coupling includes coupling the power node of the RF amplifier to the
3 second power source when the negative envelop of the RF signal reaches a
4 predetermined voltage level.

1 20. The method of claim 18, wherein:
2 second coupling includes regulating a signal level on said output node of said
3 RF amplifier so that said signal level does not fall substantially below a predetermined
4 voltage level.

1 21. The method of claim 17, wherein:
2 said first power source has a first potential and said second power source has a
3 second potential, wherein said second potential is greater than said first potential.

1 22. The method of claim 17, further comprising:
2 de-coupling the power node of the RF amplifier from the first power source
3 after a voltage level on the power node has increased a predetermined amount as a
4 result of said second coupling.

1 23. A wireless transmitter, comprising:
2 a power amplifier having:
3 an output node to carry an RF output signal; and
4 a power node coupled to said output node through a component having a
5 relatively high impedance at RF frequencies of said RF output signal;

6 an antenna to receive said RF output signal from said output node and to
7 wirelessly transmit said RF output signal;
8 a switch circuit to controllably couple said power node to a first power source
9 having a first potential; and
10 a regulator circuit to prevent a negative envelope of said RF output signal on
11 said output node from going substantially below a predetermined voltage level during
12 operation of said wireless transmitter by controllably coupling said power node to a
13 second power source having a second potential in response to said negative envelope.

1 24. The wireless transmitter of claim 23, wherein:
2 said antenna includes a patch antenna element.

1 25. The wireless transmitter of claim 23, wherein:
2 said antenna includes a dipole antenna element.

1 26. The wireless transmitter of claim 23, wherein:
2 said regulator circuit includes a negative envelope detector to detect said
3 negative envelope of said RF output signal on said output node of said power amplifier.

1 27. The wireless transmitter of claim 26, wherein:
2 said regulator circuit includes an control amplifier to compare said negative
3 envelope to said predetermined voltage level.

1 28. The wireless transmitter of claim 27, wherein:
2 said regulator circuit includes a device to allow current to flow from the second
3 power source to the power node in response to an output signal of the control amplifier.

1 29. The wireless transmitter of claim 23, wherein:
2 said component having a relatively high impedance at RF frequencies of said RF
3 output signal includes an inductor.